Section 2

Screening the Right People and Using the Right Test…

After completing this section of the module, you should be able to:

- Identify risk factors for sexually transmitted infections
- Screen for the appropriate sexually transmitted infections based on the sexual history and examination
- Identify the appropriate tests used for screening commonly encountered STDs
- Describe the screening recommendations for *Chlamydia trachomatis*

STD/HIV Prevention Training Center *of New England*
A Project of the Division of STD Prevention
Massachusetts Department of Public Health
Funded by the CDC

The Case of
John Corporate

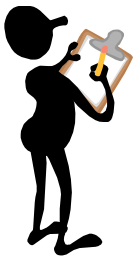
In Summary…

Mr. Corporate has a regular partner of over 20 years (his wife) with whom he has unprotected vaginal sex once a week. He has had five other female sexual partners in the last year with whom he has engaged in unprotected oral sex. He has occasionally used condoms with these partners for vaginal sex. He has concluded that he is not at risk for STDs because he is asymptomatic and has sex only with women he has met through work.

Having completed his history, you proceed with the physical examination. There are no abnormal findings when you examine the ano-genital area.

Would you offer the following to Mr. Corporate?

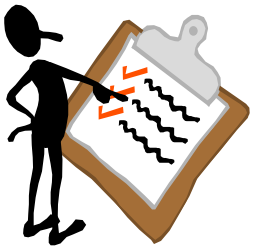
Choose one answer for each



YES	NO	
○	○	A test for gonorrhea
○	○	A test for chlamydia
○	○	A urethral gram stain
○	○	A blood test for syphilis
○	○	A test for HIV antibody
○	○	A darkfield examination

Answer to: Which tests to offer to Mr. Corporate?

A test for gonorrhea. YES!



Men infected with *Neisseria gonorrhoeae* (NG) are generally symptomatic if the site of infection is the urethra. However, most pharyngeal infections are without symptoms. Anal infections can also be asymptomatic. When screening for NG, test at the sites of exposure(s) (throat/urethra/anus/cervix). In Mr. Corporate's case, you would screen for urethral and pharyngeal gonococcal infection. The fact that he only has sex with women he meets through work certainly does not exclude him from any STD risk!

A test for chlamydia. YES!

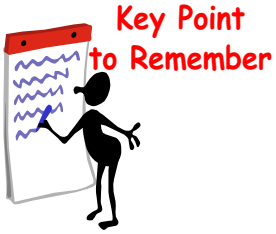
Population-based studies have demonstrated that men infected with *Chlamydia trachomatis* are frequently asymptomatic. Currently, it is recommended to screen only for urethral chlamydial infection in the context of routine male STD screening. Chlamydia is now the most frequently reported bacterial STD in the USA.

A blood test for syphilis. YES!

Even though the external ano-genital examination is normal as well as the skin examination, patients may be infected with *Treponema pallidum* and be in the latent phase. Blood tests will be positive but the patient will be asymptomatic. Rates of syphilis have come down dramatically in the USA, but it's still pertinent to screen Mr. Corporate given his history of the past year. The test is inexpensive and syphilis can be treated.

A urethral gram stain. NO!

If you have access to NG and CT screening, a urethral gram stain from an asymptomatic male is unlikely to yield any significant information. Chlamydial urethral infection is often not associated with the presence of polymorphonuclear (PMNs) cells on the gram stain. So the absence or a low count of PMNs (< 5 per 1000x) does not rule out a chlamydial infection. The gram stain is also less sensitive than a gonorrhea test. In addition, it is likely that you are not equipped to perform this test in your office. There are particular CLIA requirements for moderate complexity tests, and experience is necessary for interpretation.



Many STDs can be asymptomatic, particularly *Chlamydia trachomatis*, which is also the most frequently reported bacterial STD in the USA.

Gram stains should not be performed in the pharynx because they are not specific.

A test for HIV. YES!

Counseling and testing should be offered to Mr. Corporate. He has had unprotected vaginal intercourse with multiple partners which can put him at risk of all STDs, including HIV. Unprotected oral sex can also be risky, although to a lesser degree.

A darkfield examination. NO!

A darkfield examination can be done on lesions when anogenital ulcer disease is present to search for *Treponema pallidum*. Mr. Corporate does not have any lesions in the anogenital area.

Are there any other tests you would consider?

Human papillomavirus (HPV) and herpes simplex virus (HSV) infections are also very common STDs.

However, there is currently no recommended test other than visual inspection to detect HPV.

As for HSV, history and herpes culture of genital lesions (if present) constitute the recommended approach. Older commercially available serologies are not useful to screen for HSV because they cannot reliably differentiate HSV type 1 from HSV type 2. However, new tests with better performances are now on the market. Their clinical applications are still controversial, and we'll discuss them later in the module.

What about the leukocyte esterase test (LET)?

Good question! The LET can be used on the first 10 to 15 cc of fresh unspun urine to detect the PMNs and thus urethritis. If the test is 1 + or more, it is considered positive. You then need to proceed to test for both NG and CT as the LET will obviously not differentiate between the two.

This test has been used with variable success for population-based screening. However, it is clearly both less sensitive and less specific than the amplified tests for gonorrhea and chlamydia, as we will see later.

Do you want to change any of your answers on page 13?

You discuss Mr. Corporate's risk of STDs. You tell him that the absence of symptoms does not eliminate the presence of STDs. Neither does having unprotected sex with "professional women" (i.e.… women he met through work). You propose to test him for chlamydia, gonorrhea, syphilis and HIV.

1. Which test is optimal to screen for pharyngeal *Neisseria gonorrhoeae*?

Choose only one answer

- ○ **A**

  A culture

- ○ **B**

  An enzyme immunoassay (EIA) such as the Gonozyme®

- ○ **C**

  A DNA probe such as Genprobe®

- ○ **D**

  An amplification test such as the ligase chain reaction (LCR) or the polymerase chain reaction (PCR)

2. Which test is optimal to screen for urethral *Neisseria gonorrhoeae*?

Choose only one answer

- ○ **A**

  A culture

- ○ **B**

  An enzyme immunoassay (EIA) such as the Gonozyme®

- ○ **C**

  A DNA probe such as Genprobe®

- ○ **D**

  An amplification test such as the ligase chain reaction (LCR) or the polymerase chain reaction (PCR)

3. Which test is optimal to screen for urethral *Chlamydia trachomatis?*

Choose only one answer

○ **A**

A culture

○ **B**

An enzyme immunoassay (EIA) such as the Chlamydiazyme®

○ **C**

A DNA probe such as Genprobe®

○ **D**

A direct fluorescent antibody test (DFA) such as Microtrak®

○ **E**

An amplification test such as the ligase chain reaction (LCR), the polymerase chain reaction (PCR) or the transcriptase mediated amplification (TMA) tests

4. Which blood test is optimal for routine screening for latent syphilis?

Choose only one answer

○ **A**

The RPR or the VDRL

○ **B**

The TP-PA or the FTA-ABS

Answer to: Which laboratory test to use in Mr. Corporate's case?

1. To screen for pharyngeal gonorrhea: Use **A**

When testing for NG in the pharynx, the culture is the only method recommended because it is highly specific. None of the other tests (B, C, D) are approved for pharyngeal testing. Culture would also be the only recommended test for anal sites.

2. To screen for urethral gonorrhea: Use **A**

Although all of the other tests are approved for urethral NG testing, the culture remains the gold standard to detect *Neisseria gonorrhoeae*, as long as transport conditions are met. It can also be used for antibiotic susceptibility testing. If the culture is not available or the transport conditions cannot be met, then the amplification tests are the most sensitive. The ligase chain reaction can also be used on urine, which has the distinctive advantage of circumventing the urethral swab (which for some men comes in second after a root canal on the list of most memorable experiences). The DNA-probe is less sensitive than the amplification tests and less specific than the culture, but still a good choice if neither the culture nor the amplified tests are available.

The EIA is not used frequently in the USA, and has no advantage over the other tests.

3. To screen for urethral chlamydia: Use **E**

Nucleic acid amplification technology is the most sensitive to detect *Chlamydia trachomatis.* Urine samples can also be used. Although cultures are the most specific, they are less sensitive than previously thought (at best 70% to 80%). The optimal transport conditions are difficult to achieve, and cultures are not readily available. The DNA probe would be the next best test. Compared to the amplified tests, the EIA and the DFA are much less sensitive to detect asymptomatic urethral chlamydial infections.

The culture is the only recommended test to detect *Neisseria gonorrhoeae* in the pharynx and anus. Amplification tests (LCR,PCR,TMA) are the most sensitive tests to detect asymptomatic urethral *Chlamydia trachomatis* infection. Use nontreponemal tests (RPR,VDRL) to screen for syphilis.

4. To screen for latent syphilis: If you answered B, you are wrong!

Treponemal tests (TP-PA, FTA-ABS) are used to confirm a positive nontreponemal test (RPR,VRDL). They should never be used to screen for asymptomatic syphilis. Perform nontreponemal tests first. If they are positive, confirm the diagnosis of syphilis with a treponemal test. The MHA-TP is no longer manufactured and has been replaced by the TP-PA (Treponem Pallidum Particle Agglubination test) which has similar test performance characteristics.

Summary of Test Performance Characteristics: *Neisseria gonorrhoeae*

Culture

Site	Sensitivity (%)	Specificity (%)
male urethra		
symptomatic	94 - 98	100
asymptomatic	85	100
cervix	84 - 96	100
pharynx	50 - 70	100
anus/rectum	70 - 85	100

Non-amplified nucleic acid test (DNA-probe)*

(Average sensitivity 75% - 80% and specificity 98%)

Site	Sensitivity (%)	Specificity (%)
male urethra	71 - 98	96.7 - 99
cervix	75 - 98	96.3 - 99

**not approved for pharynx, anus/rectum, urine*

Amplified nucleic acid test**

(Average sensitivity >90% and specificity >99%)

	Sensitivity (%)	Specificity (%)
Ligase Chain Reaction (LCR)		
cervix	95 - 100	99.6
female urine	95	100
male urethra	99 - 100	99.9
male urine	89 - 99	99.7
Polymerase Chain Reaction (Multi PCR)		
cervix	100	99.4
female urine	90	95.4
male urethra	92 - 97	97 - 100
male urine	94	98.5

Enzyme Immunoassay (EIA)**

(Average sensitivity 70% and specificity 95%)

Site	Sensitivity (%)	Specificity (%)
Urethra	no benefit over gram stain	
Cervix	72%	94%

*** not approved for pharynx, anus/rectum*

Summary Test Performance Characteristics: *Chlamydia trachomatis*

Culture *(Average sensitivity 70% - 80% and specificity 100%)*

Site	Sensitivity (%)	Specificity (%)
cervix	50 - 80	100
female urine	<30	100
male urethra	50 - 80	100
male urine	<20	100

Non-amplified nucleic acid test (DNA-probe)*

(Average sensitivity 75% and specificity 98% - 99%)

Site	Sensitivity (%)	Specificity (%)
cervix	63 - 100	96.3 - 100
urethra	68 - 100	96.7 - 100

**not approved for pharynx, anus/rectum; higher sensitivity in symptomatic patients*

Amplified nucleic acid tests**

(Average sensitivity >90% and specificity >99%)

	Sensitivity (%)	Specificity (%)
Ligase Chain Reaction (LCR)		
cervix	91.3 - 95.8	99.8 - 100
female urine	93.8 - 96.3	99.9 - 100
male urethra	93.3 - 98.8	100
male urine	92.5 - 96.4	99.6 - 100
Polymerase Chain Reaction (PCR)		
cervix	88.7 - 100	99.7 - 100
male urethra	90-92	100
male urine	92.8 - 97.4	99.4 - 100
Transcriptase Mediated Assay		
cervix	99	98.6 - 99.5
female urine	83.3 - 93.8	98.8 - 100
male urethra	98.2	95
male urine	93.5 - 100	96.5 - 99.2

Enzyme Immuno Assay (EIA)**

(Average sensitivity 70% – 80% and specificity 97% - 99%)

Site	Sensitivity (%)	Specificity (%)
Male urethra	70 - 80	97 - 99
Cervix	60 - 85	97 - 99

***not approved for pharynx, anus/rectum*

Review of Terminology for Test Performance Characteristics

Sensitivity:

True positive (TP) rate

"out of 100 infected persons, how many have a positive test?"

Specificity:

True negative (TN) rate

"out of 100 uninfected persons, how many have a negative test?"

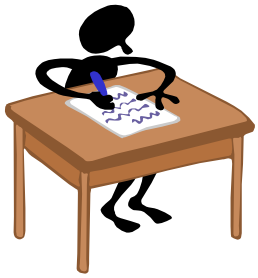
Example: Let's apply this to a new hypothetical test developed for *Chlamydia trachomatis*. To simplify the math, let's perform the test on 100 infected persons and 100 uninfected persons. Infection status would be determined by using " a gold standard " (GS). Two-by-two tables are often used to illustrate the concepts.

	Persons infected (as determined by + GS)	Persons uninfected (as determined by – GS)
New test +	99 (a) True Positives	2 (b) False Positives
New test -	1 (c) False Negatives	98 (d) True Negatives
	100	100

sensitivity: 99/100 = TP rate = a/a+c
(probability of a positive test in an infected person)
specificity: 98/100 = TN rate = d/b+d

false negative rate: 1/100 = c/a+c
false positive rate: 2/100 = b/b+d
(probability of a positive test in an uninfected person)

Mr. Corporate is hesitant at first to go through all this testing because he thinks you're overdoing it and exaggerating the risk. He finally agrees to the proposed STD screening, but refuses to undergo a urethral swab. You are pleased to announce that it can be substituted by a urine test.



Describe:

A. How you would collect the gonorrhea pharyngeal specimen

B. How you would plate and prepare the specimen

C. How you would collect the urine specimen

Answer to: How to collect and plate specimens?

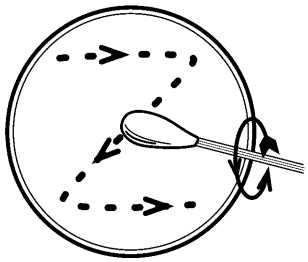
A. How to collect the gonorrhea pharyngeal specimen:

Gently rub the posterior pharynx and the tonsillar crypts with a sterile cotton-tipped swab.

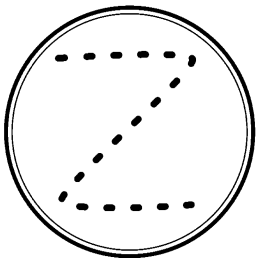
B. How to plate the gonorrhea specimen

DOs...

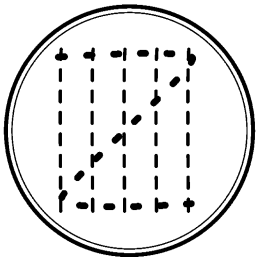
- Roll the swab in a "Z" pattern on Thayer-Martin medium



that is room temperature or warmer



- Cross streak the plate with the same swab



- Incubate within 15 minutes in a humidified atmosphere with 2% to 10% CO_2 (CO_2 incubator, candle jar or bag and pill) at 35º to 36º C.

And DON'Ts...

- Set the incubator at a temperature higher than 36ºC. You will cook your NG colonies!
- Transport the plates to an outside laboratory before 12 to 16 hours of incubation. The colonies will not have had the time to grow.
- Don't leave the plates outside in freezing (or scorching) weather, waiting to be picked up by the courier. A sure way to kill your colonies.

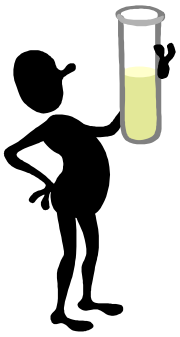
Incubate the Thayer-Martin plates at 36ºC with an atmosphere of 2% to 10% CO_2. Wait at least 16 hours before transport to the laboratory to give the colonies a chance to grow. Use the 10cc to 20cc of first-void urine for NG and CT testing with amplification tests. Follow the manufacturer's instructions for storage and transport.

Tip of the day

Unused TM plates that have been allowed to reach room temperature can be left out of the refrigerator for a period of up to 72 hours. If a clinical session is not scheduled for the next 72 hours, refrigerate unused plates and use those first the next time they are needed. Caught off guard? Putting the plates in the incubator for 5 minutes while the patient is getting ready will warm them appropriately for use.

Answer to: How to collect the urine specimen?

C. How to collect the urine specimen for NG and CT Testing:



The patient should not have voided for at least two hours before specimen collection. Only the first 10cc to 20cc of urine should be collected. Mark the cup for that volume and instruct the patient to fill it to the line with the first drops of urine. Follow the manufacturer's instructions for storage and transport as they may differ from one test (ligase chain reaction) to another (transcriptase mediated amplification or TMA).

WARNING: Some of you out there may be thinking that you might as well skip the genital exam altogether: just collect urine for CT and NG and collect blood for the RPR and HIV antibody test, and voilà! A complete STD exam. Wrong! You still need to examine the genitals to look for signs of STDs, such as sores and warts. You can be surprised at what you will find in patients who claim absolutely no problems…

You collected the pharyngeal specimen for gonorrhea. The patient provided the urine specimen which will be used to test for *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. You will collect blood to test for syphilis and HIV.

As part of your HIV pre-test counseling session, you:

Choose one or more answers

☐ **A**

Explain the meaning of positive, negative and indeterminate HIV antibody test results.

☐ **B**

List all the HIV risk behaviors.

☐ **C**

Discuss with him how he thinks he can reduce his risk.

☐ **D**

Obtain his written consent to perform the test.

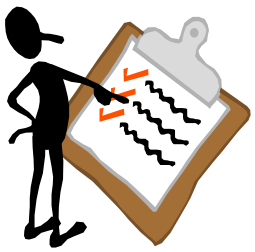
☐ **E**

Discuss with him how he will inform his partners should his HIV antibody test be positive.

Answer to: What to cover for HIV pre test counseling?

If you answered **A, C, D,** you are on the right track!

If **B** and **E** were part of your answer, not the best!



Here's why, and what else you need to include in the session.

First and always, talk about confidentiality provisions: where the test result will be filed, reporting requirements, who will have access to the result. Reinforce that you will not divulge the result of the tests to his entourage without the patient's consent.

You should define the meaning of:

A positive test result:

"If your HIV antibody test is positive, it means that you have been exposed to HIV in the past and are now infected with the virus. It does not mean that you have AIDS."

A negative test result:

"If your HIV antibody test is negative, it generally means that you are not infected with HIV. However, it takes sometimes six weeks to six months for the body to produce antibodies against HIV once infected. If you were exposed to the virus in the past 6 months, especially in the past 6 weeks, and got infected, your test may not pick up the infection yet, and may still be falsely negative.

An indeterminate test result:

"Two tests are used to determine the presence of HIV antibody. If the first test is positive, then a confirmation test is done. Sometimes, this test is negative while the first one is positive. In these circumstances, the test is repeated at that time and then again in two to three months.

You can address the benefits of testing which include getting early care for HIV if infected.

Answer to: What to cover for HIV pre test counseling?

Enlisting the participation of the patient is more effective than reading out a list of risk factors (which is why B is wrong). You need to focus on what the patient perceives as his/her particular risk for HIV and assess their knowledge about it. Help to identify factors related to the continued behavior.

You could ask:

"Mr. Corporate, what do you think puts you at risk of HIV and STDs?"

You hope that Mr. Corporate will mention unprotected vaginal intercourse with multiple sexual partners… If that does not come up, you need to address this with him. Although his risk of acquiring HIV is probably low to moderate, it is not absent.

Then you can discuss with Mr. Corporate how he thinks he could realistically reduce his risk of HIV/STD and agree on a plan: he could decide to be monogamous or to use condoms for every sexual encounter. You can ask him about what his experience has been with condoms, and if he has any barriers to using them.

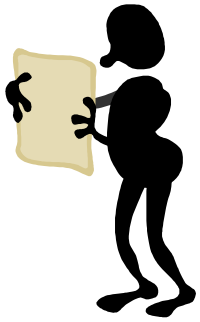
The issue of partners is most usefully raised after testing. There's no use in getting into this potentially contentious issue before the results are known. This can be part of the post test counseling (why E is wrong).

Finally, the patient needs to sign a consent form to give permission for testing.

HIV Pre-test Counseling should always include

- discussion of confidentiality provisions.
- explanation of a positive, negative and indeterminate test results.
- summary of the benefits of testing.
- participation of the patient in assessing the behavior(s) that put them at risk and discussion of the impact of a positive test.
- agreeing with the patient on a realistic risk reduction plan.

Counseling and testing for HIV were completed and all specimens were sent to the lab. You schedule a follow-up appointment with Mr. Corporate.



Before his visit, you receive the results of his testing:

HIV antibody test: negative

RPR: negative

Ligase chain reaction (LCR) for *Neisseria gonorrhoeae*: negative

Ligase chain reaction (LCR) for *Chlamydia trachomatis*: positive

You give Mr. Corporate his results. You explain that chlamydia is a sexually transmitted disease. He needs to be treated, as well as his partners, including his wife. Mr. Corporate agrees to be treated, but he adamantly refuses to tell his wife about this and wished you had never done the testing in the first place (at this point, you almost wished you hadn't either).

Your approach to management is:

Choose only one answer

○ **A**

You advise Mr. Corporate that he can tell his wife that he was treated for a urine infection and it would be better if she was also treated for it because the bacteria lives normally in the vagina.

○ **B**

Tell the patient you refuse to continue seeing him unless his wife is informed of the nature of the infection.

○ **C**

Send an anonymous letter to his wife informing her of the exposure.

○ **D**

Contact public health authorities so they can inform his wife.

○ **E**

Call his wife and set up an appointment at your office to inform her of the exposure.

○ **F**

Try to convince him of the importance of informing his wife and offer assistance.

Answer to: How to manage Mr. Corporate's partner(s), particularly his wife?

The answer is **F**. Convincing and offering assistance

The major legal issues at stake here are confidentiality and duty to warn.

Most state laws do not protect you against breach of confidentiality should you decide to inform the wife without Mr. Corporate's consent.* Duty to warn does not apply to STDs in most states, so check with your STD Division.

As a rule, partner notification is voluntary and confidential. State Health Department personnel cannot inform third parties without the consent of the infected persons, even if requested by physicians.* They can assist consenting infected persons in informing contacts either by doing it for them (although contacts are never informed of the source, in this case, it is probably obvious) or coaching them to do it themselves.

When a person initially learns that he/she has an STD, the information itself may be overwhelming. The patient needs to process this before he/she is willing or capable of informing exposed partners.

The best approach is to try to convince the patient of the necessity of partner evaluation and treatment, reinforcing this at a later visit. In trying to convince Mr. Corporate to tell his wife, it may be helpful to inform him of the adverse consequences of untreated chlamydial infections in women, such as PID and its sequelae of chronic pelvic pain. Also, note that he will get reinfected if his wife is not treated.

Advising Mr. Corporate to lie or mask the truth is not ethically justifiable, even though it may achieve the end, that is, treating Mrs Corporate.

**This is the case for Massachusetts. However, the laws regarding HIV infection may differ from state to state. Check with your state STD or HIV Division for guidance and information about HIV partner notification and confidentiality laws.*

Epilogue

Mr. Corporate took azithromycin for his chlamydial infection. After much coaching, he finally told his wife about the infection. She came to the office for testing and treatment. She was also looking for answers on questions such as how long her husband had the infection, when he may have given it to her, etc. Her husband had told her that he had had one extra-marital affair many months ago and deeply regretted it. The physician told her what he knew about the epidemiology of the infection but could not make any reference to when transmission occurred (her cervical LCR test was also positive). He did not (and could not) comment on Mr. Corporate's story.

The Case of
Juan Fernandez

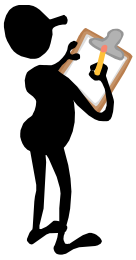
In Summary

Juan is a 20 year old Latino college student who presented to your office because of fatigue. He has not noticed any other symptoms (fever, weight loss, diarrhea, etc.). He is a member of the college basketball team. He has been feeling very stressed lately. His sexual history reveals that he engaged in unprotected oral and anal sex with male casual partners whom he knows very little about. He also has sex with women, but has not had any female partners for the last six months.

After listening carefully to his history and reviewing his symptoms, you proceed with the physical examination. You find a few cervical lymph nodes that are soft, small and freely mobile. You notice that his weight has dropped by 5% in 6 months. When you examine the anogenital area, you notice several small rough, irregular, spiked verrucous dry lesions near the anus.

Would you offer the following tests to Juan?

Choose one answer for each



YES	NO	
○	○	A test for gonorrhea
○	○	A test for chlamydia
○	○	A rectal gram stain
○	○	A blood test for syphilis
○	○	A test for HIV antibody
○	○	A darkfield examination

Answer to: Which tests to offer to Juan?

A test for gonorrhea. YES!

As previously stated, gonococcal infections may be asymptomatic, particularly if in the pharynx or anus. Screen for gonorrhea in the pharynx (see page 61), urethra and anus, since these were all sites of exposures for Juan.

To collect the urethral specimen, remember that you need to insert the swab 1 to 2 cm into the urethra: sampling the meatus is not sufficient because columnar epithelial cells that line the urethra are required for a good specimen!

Here's how to collect an anal sample:
Insert the swab into the anus about 3 cm while exerting lateral pressure to avoid fecal material. Rotate the swab for ten seconds to sample crypts just inside the anal ring. If the swab is stained with feces, discard sample and repeat specimen sample.

A test for chlamydia. YES!

Juan may have acquired chlamydia from female or male sexual partners. As mentioned, only screen for urethral infection. If you are collecting from the urethra, make sure you go *2 to 3 cm into* the urethra, and rotate as you withdraw the swab (you won't win the popularity contest with your patients, but you will have adequate specimens because you need columnar epithelial cells).

A rectal gram stain. NO!

Unless you find the presence of mucopus at examination, suggesting the presence of proctitis, this test is not sensitive to detect gonorrhea. As far as doing a urethral gram stain, it may detect the presence of gram negative bacteria often associated with unprotected rectal intercourse due to contact with fecal bacteria.

A blood test for syphilis. YES!

While overall rates of syphilis have dropped dramatically since 1990, some areas of the country have witnessed an alarming increase in syphilis among men who have sex with men (MSM). Juan had multiple anonymous sex partners, which puts him at significant risk.

A test for HIV antibody. YES!

A darkfield examination. NO!

The anal lesions described on page 79 are typical of condyloma acuminata caused by HPV. They are rough, irregular, spiked dry lesions. Condyloma lata are the moist, softer lesions associated with secondary syphilis. However, in practice, condyloma lata can sometimes be confused and dismissed as condyloma acuminata. If these lesions were condyloma lata, they would be teeming with *Treponema pallidum*, which could be identified with the darkfield. In addition, since condyloma lata appear during the secondary stage of syphilis, both the non treponemal tests, (RPR or VDRL) and the treponemal tests (TP-PA or FTA-ABS) would be positive.

Are there other tests you would want to perform?

Juan has anal condyloma (HPV) by visual inspection.

You will need to offer counseling and treatment. In addition, an anoscopy is indicated to search for condyloma primarily in the anal canal as warts rarely extend beyond the pectinate line into the rectum.

We have already discussed in the previous case the issue of HSV and the LET, and comments are also applicable to Juan.

Juan is also at risk of acquiring hepatitis B which is prevalent among men who have sex with men. You should consider performing a test to detect hepatitis B virus surface antigen (HBsAg) and antibody to the surface antigen (anti-HBsAg).

There have been outbreaks of hepatitis A, generally symptomatic, among MSM who engage in anal intercourse and oral/anal contact. Vaccination of men at risk is recommended.

Finally, *routine* screening for hepatitis C in persons with multiple sex partners is not currently recommended. Although the risk is not absent, sexual transmission is not a major mode of transmission of hepatitis C.

Would you change any of your answers on page 26?

You explain to Juan that you have discovered anal condyloma acuminata or warts. He tells you he thought those were hemorrhoids. You counsel him about the infection and offer to provide treatment. Since you are not proficient in anoscopy, you propose to refer him to a colleague of yours. You tell him that he should get screened for other STDs: gonorrhea, chlamydia, syphilis, hepatitis B and HIV. You explain that the latter two could be responsible for his fatigue.

Which test you would use to screen for pharyngeal gonorrhea:

Which test for anal gonorrhea:

Which test for urethral gonorrhea:

Which test for urethral chlamydia

Which test(s) for hepatitis B

Answer to: Which laboratory tests to use in Juan's case?

To screen for gonorrhea in the pharynx and anus: a culture

To screen for gonorrhea in the urethra: a culture or amplification test (LCR). You can either use the urethral swab or urine if you will be using the amplified test.

To screen for chlamydia in the urethra: an amplification test (LCR, PCR or TMA). You can either use the urethral swab or urine. Go back to pages 66 and 67 to review test performance characteristics.

To screen for hepatitis B:

Hepatitis B surface antigen (HBsAg)

Antibody to Hepatitis B surface antigen (anti-HBsAg)

Juan agrees to get tested for STDs. He doesn't remember ever being tested for hepatitis B. You collect pharyngeal and rectal specimens to screen for *Neisseria gonorrhoeae*. A urine specimen is used to detect *Neisseria gonorrhoeae* and *Chlamydia trachomatis*. Blood will be drawn for HBsAg and anti-Hbs and HIV antibody testing. You provide pre-test counseling for HIV testing, making sure you cover all the essentials.

You should spend more time counseling Juan than you did with Mr. Corporate

Choose only one answer

- ○ True
- ○ False
- ○ Not Sure?

Answer to: You should spend more time with Juan than with Mr. Corporate for HIV pre-test counseling?

True!

Juan is at high risk of having acquired HIV because he engaged in unprotected receptive anal intercourse with relatively anonymous partners. He is at much higher risk than Mr. Corporate.

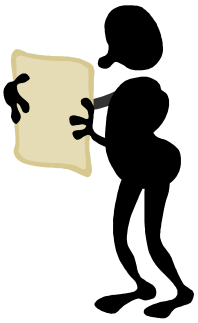
In addition, you must take into consideration his cultural background and assure that he fully understands what you are explaining.

You need to enlist Juan's participation in the discussion of his risk. It's likely that Juan has adequate knowledge about safe sex behaviors: you can help him identify the factors that prevent him from adopting these safer sex behaviors. Hopefully, Juan will be able to decide on a risk reduction plan that he thinks is realistic. After discussion, Juan states that for now, he will abstain. He has difficulty accepting his homosexuality and cannot even imagine telling his family.

You need to take more time in discussing the impact of a positive test in the context of his culture, psychological stability and social support. If his test was positive, Juan tells you he has no one to turn to. His family is not an option: not only would having a positive test be disastrous, but it would also expose his sexual preference.

After the pre-test counseling, Juan tells you that he is not ready for HIV testing and prefers not to do it today. He wants to think about it some more. You respect his decision and agree that he needs more support and time. You refer him to the college psychologist for help with his personal issues. You set an appointment for him in 10 days to review the other test results, give a second treatment for HPV (you performed cryotherapy) and revisit the HIV antibody testing issue if he wishes to.

You receive Juan's test results before his visit:



Culture for *Neisseria gonorrhoeae* – pharynx: negative

Culture for *Neisseria gonorrhoeae* – anus: negative

Ligase chain reaction for *Chlamydia trachomatis* – urine: negative

Ligase chain reaction for *Neisseria gonorrhoeae* – urine: negative

RPR: negative

Anti-HBsAg: negative

HBsAg: positive

From these results, what can you say about his hepatitis B status?

Choose one or more answers

☐ **A**

He is in the early phase of the disease.

☐ **B**

He is highly infectious.

☐ **C**

He is a chronic carrier of hepatitis B.

☐ **D**

He would benefit from hepatitis B vaccine.

☐ **E**

Testing for antibodies against the core antigen would be useful.

Answer to: What can we conclude about Juan's Hepatitis B status from his results (HbsAg pos. and anti-HbsAG neg.)?

A. Early phase of disease?

It is not possible just by these results to determine if Juan is in the acute phase of the infection (less than six months of duration) or if he is a chronic carrier of hepatitis B. Fatigue, which may be the only symptom of acute hepatitis B, could also be caused by a variety of other disorders. He has no other signs and symptoms. We have no other laboratory tests available (such as liver function tests). Although he has been at risk recently (within the incubation period) of acquiring the infection, he has engaged in high risk behaviors for more than one year. You have no other test results for comparison.

B. Highly infectious?

You cannot tell at this point. In the early phase of hepatitis B, persons may be highly infectious. High infectivity is also associated the presence of concomitant HbeAg, especially in the later stages. Juan should be tested for HbeAg.

C. Chronic carrier of hepatitis B?

Unclear. You cannot tell if Juan has been a carrier of hepatitis B for more than six months.

D. Would benefit from Hepatitis B vaccine?

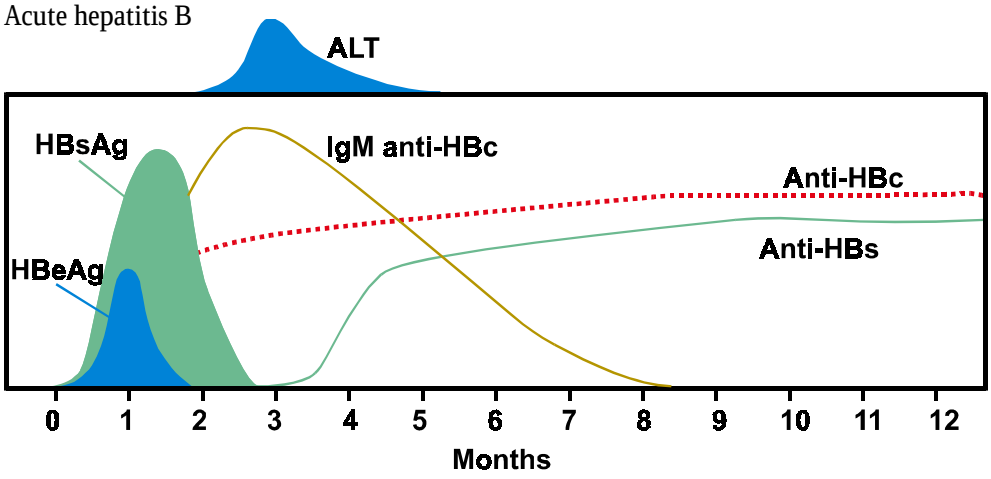
No. Juan has already been infected with the virus and he is either in the acute or chronic phase of the disease. Vaccination is only used for preventing disease and has no impact on viral clearance. Had he been negative for both HBsAg and anti-HBsAg, he would be a candidate for vaccination.

E. Testing for antibodies against the core antigen would be useful?

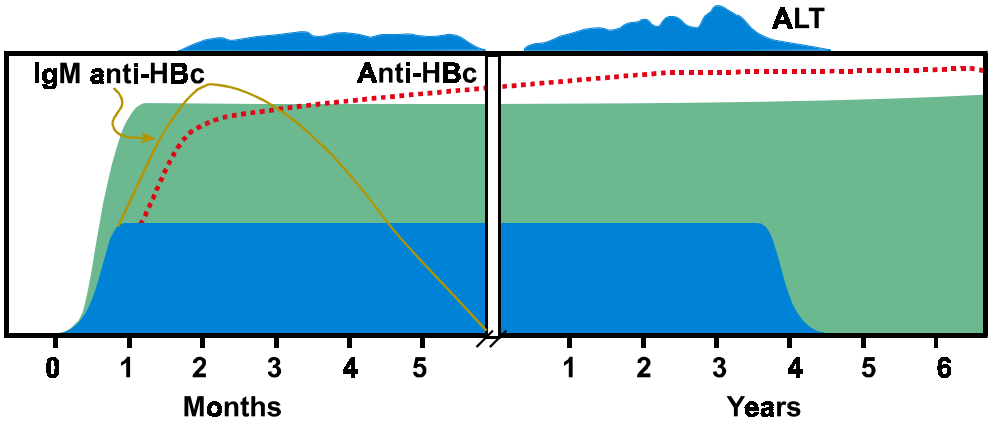
Yes. If the IgM is positive, the hepatitis has generally been present for less than 6 to 8 months and is considered a marker for recent infection. He should also have his liver enzymes checked.

Virologic and Serologic Course of Hepatitis B

Acute hepatitis B



Chronic hepatitis B



Epilogue

Juan's IgM anti-HBcAg was positive and his HbeAg was positive. His ALT was slightly elevated. Juan agreed to be tested for HIV one month later. He had abstained from sexual activity during that time. He was seeing the psychologist on a regular basis and found it helpful for dealing with his sexual preferences and adopting safer sex behaviors in the future. His HIV test result was positive. His physician continued to care for him as she was experienced in HIV care. This continuity of care was very important for Juan as he had confidence in her and had developed a trusting relationship. The anal condyloma responded to treatment, but she counseled him about recurrence. She was also concerned about anal intraepithelial neoplasia (AIN) given his HIV status and HPV infection. The colleague who performed the anoscopy and colonoscopy would provide guidance for follow-up as colposcopic examination was currently normal as well as cytologies.

The Case of Susan Shy

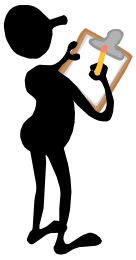
In Summary

Susan Shy presented to your office complaining of vaginal discharge accompanied by itching and burning. She has not noticed any odor nor pelvic pain. She has no urinary symptoms. She gets this a few times a year. She has only had female sex partners for the last six years, and has been with the same partner for one year. Her partner has had a male sexual partner recently.

You proceed with Ms. Shy's pelvic examination. There is erythema around the introitus as well as small fissures and erosions on the perineum. The vaginal discharge is clumped, white, and adherent. The cervix appears normal.

Would you do the following tests?

Choose only one answer for each



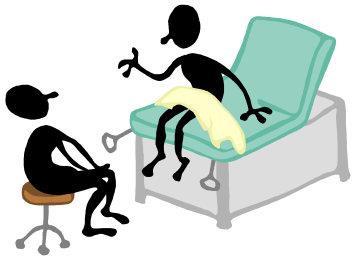
YES	NO	
○	○	Vaginal pH
○	○	Amine test
○	○	Vaginal yeast cultures
○	○	Saline Wet mount
○	○	Vaginal cultures for GV*
○	○	Gonorrhea test
○	○	Chlamydia test
○	○	Cervical gram stain
○	○	Herpes culture

**Gardnerella vaginalis*

Answer to: Which tests to offer to Ms. Shy?

Vaginal pH: YES!

In fact, after assessing the appearance of the vaginal discharge, this should be the first test that you do. It is very helpful in orienting your diagnosis. The normal vaginal pH after menarche lies between 3.8 and 4.2. The pH is generally below 4.5 in yeast infections, while it is higher in bacterial vaginosis and trichomoniasis. To take the pH of the vaginal secretions, you can:



> Use a sterile swab to collect secretions from the mid section of the lateral vaginal walls, and apply to the pH paper. Alternatively, place the pH paper strip directly on the mid lateral vaginal wall. Determine pH according to manufacturer's instruction and scale.

Warning!

Remember that the pH will be alkaline in the presence of blood, sperm, or cervical mucus. So, if the patient is menstruating or had unprotected vaginal sex with a man before the visit, the pH determination will not be useful. Also, keep way from the vaginal pool when collecting vaginal specimens as it is often mixed with cervical secretions.

Amine test: YES!

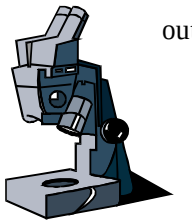
Also called the "whiff test," this can be the second test you do. It is generally positive in bacterial vaginosis (and is one of the clinical diagnostic criteria) and occasionally in trichomoniasis. It is absent otherwise. Here's how to do it:

> Use a sterile swab to collect a sample from the mid lateral vaginal wall, then roll the swab on a slide. Add a drop of 10% KOH, and mix with a swab. Bring close to the nose to assess for amine (fishy) odor ("whiff test").

Vaginal yeast cultures: NO!

The routine use of yeast cultures is not recommended as a diagnostic tool because many women are normally colonized with *Candida albicans*. Consider cultures to confirm recurrent vulvovaginal candidiasis or if the wet mount does not demonstrate yeast forms in the presence of signs and symptoms. But note that only 40% of women complaining of pruritis actually have a yeast infection!

Saline Wet Mount: Yes!

Take your  out of the closet and start using it!

Saline (and KOH) wet preparations can be help you diagnose the cause of vaginal discharge at least 80% of the time. Proper specimen collection though is crucial. Follow the steps below:

Saline Prep:

1. Use a sterile swab to collect secretions from the mid lateral vaginal walls. Place the swab in a small test tube containing 0.5 cc of 0.85% sterile saline. Shake the swab in the tube to create a turgid solution. Using the swab in the saline, place a drop of the suspension onto the glass slide.
2. Alternatively, place a large drop of 0.85% sterile saline on a slide. Collect sample from the mid lateral vaginal wall with a sterile swab and mix with the saline drop to create a turbid solution. Add coverslip and read. Always use room temperature (or warmer) saline! KOH Prep: After doing the amine test (see above), use that slide to add a coverslip. Wait 2 to 5 minutes to read.

Warning!

Don't roll your swab directly on the slide, add a drop of saline and then the coverslip. Your slide will be virtually impossible to read because it is too thick with cellular material. Remember that *Trichomonas vaginalis* can become immobilized quickly, so the first saline method may be more appropriate.

Vaginal Culture for *Gardnerella vaginalis:* If you answered Yes, you're wrong!

Gardnerella vaginalis is part of the normal vaginal flora in over 60% of women, therefore cultures may be positive in women who do not have bacterial vaginosis (BV). We'll see later how you can make a diagnosis of BV.

A Gonorrhea test: Yes!

At least initially. As previously mentioned, women who have sex exclusively with women may be at low risk of bacterial STDs (very limited data). In this case, her female partner engaged in unprotected sexual vaginal intercourse with a male a few weeks before. Because they exchange sex

toys, there is a small risk of transmission. A cervical culture is ideal. Otherwise, an amplified nucleic acid test would be the next best choice, followed by a non-amplified nucleic acid test. Because her risk is very low, choosing a very specific test is important to reduce the probability of a false positive test.

Taking a proper cervical specimen is crucial. Here's how:

> Remove external vaginal secretions or excess mucus from the cervix with a large cotton swab. Insert a sterile cotton swab into the endocervical canal. Rotate swab for 5 to 10 seconds to allow absorption of secretions.

A Chlamydia test: Yes!

Same reasoning as above. Always obtain the endocervical sample for CT after the NG sample. Insert manufacturer's sterile swab into the endocervix and rotate for 15 to 30 seconds to ensure adequate sampling. It's important to collect columnar epithelial cells, not just mucus. Follow the manufacturer's instructions for transport conditions. Alternatively, you could screen for CT in urine by using an amplified nucleic acid test.

Stop!

The presence of a large amount of blood in the specimen may interfere with the test performance of the DNA-probe (8% or more may cause false positive tests) and the ligase chain reaction. Check with your laboratory. Some labs deal with this by diluting the specimens. If the patient is menstruating, consider postponing testing, unless the patient is very unlikely to return.

A cervical gram stain: No!

Gram stains of the cervix are neither sensitive nor very specific for detecting the presence of *Neisseria gonorrhoeae*. Because there are no standard criteria regarding the number of PMNs to use for the diagnosis of mucopurulent cervicitis, the gram stain is no longer part of the diagnostic criteria for this clinical entity. Visual identification of endocervical mucopus and friability is sufficient for diagnosis. Especially since Ms. Shy is not at high risk of NG, there is no need for this test.

Herpes simplex virus culture: Consider it!

The clinical manifestations of herpes simplex virus infections vary widely. Asymptomatic shedding and atypical presentations are probably the most common presentations. Susan stated that she gets the itching and burning a few times a year without discharge. Further questioning reveals that she has experienced recurrent symptoms of burning and itching for

about three years. The examination reveals small fissures along the perineum, which could be consistent with an atypical presentation of herpes. Herpes simplex virus type 1 can be transmitted through oral genital contact, in which she engages with her female partner. The diagnostic yield of the cultures depend on the stage of lesions: the sensitivity is higher when vesicles are present and declines as lesions dry up and crust. It's important to gather cells when you collect a specimen for culture, so make sure that you rub the base of the lesions carefully. You can also increase the yield by collecting at multiple sites. So, you decide to perform the culture.

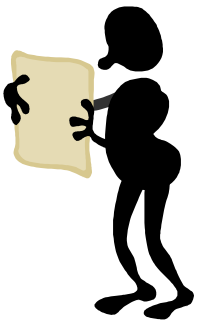
Are there any other tests you would consider?

As previously mentioned, commercially available HSV serologies were not specific until the recent development of new tests. The POCkit™ HSV 2 rapid test by Diagnology can be performed in the office and results can be read on site in less than 10 minutes. Specificity to HSV-2 runs between 94% and 100%, and sensitivity is over 90%. Overall, 70% of primary HSV-2 patients were positive with the POCkit™ within 4 weeks. The other test is the HSV-2 or HSV- 1 IgM and IgG ELISA developed by Meridian. It is not a rapid test and needs to be sent out to a commercial laboratory. The sensitivity is lower than the POCkit™ early in infection.

The clinical applications are somewhat controversial at this time, but clearly these serologies could be used to diagnose HSV-2 when the clinical picture is unclear. In the case of Susan, however, the lesions may be caused by HSV-1. Remember that in general, about 10% to 30% of genital herpes are HSV-1. If Susan has a negative serology for type 2, it would not rule out genital herpes, while a positive HSV-1 serology would not necessarily imply genital herpes.

Susan is at very low risk of syphilis and HIV infection, so testing for these is not necessary at this time, given the examination. However, her partner may be at high risk. You need to explore this further.

What was mentioned about HPV screening (see page 54-55) also applies to women, and you inform her of this. A Pap smear would be appropriate if it's been more than a year since her last one.



Susan's bimanual examination is normal. The results of the specimen you collected are as follows: the vaginal pH is normal (4.0). The amine test is negative. The wet mount shows yeast buds and hyphae. There are no clue cells nor *Trichomonas vaginalis*. You tell Susan that she has a yeast infection and describe the treatment options. You do not think it necessary to treat her female partner. You don't have access to cultures or nucleic acid amplification tests at that clinic, so you perform a non-amplified nucleic acid probe for *Chlamydia trachomatis* (CT) and *Neisseria gonorrhoeae* (NG). You do have access to herpes culture, so you perform them on the fissures. You receive some results four days later. The CT test is negative but the NG test is positive. You know that the gen-probe is about 80% sensitive and 98% specific for the detection of NG.

Faced with these results, you conclude:

Choose one or more answers

☐ **A**

Susan has a 80% probability of having gonorrhea.

☐ **B**

Susan has a 98% probability of having gonorrhea.

☐ **C**

Susan has a 20% probability of having a false positive test, for gonorrhea.

☐ **D**

Susan has a 2% probability of having a false positive test, for gonorrhea.

☐ **E**

Susan has a less than 50% probability of having gonorrhea.

Answer to: What is Ms. Shy's probability of being infected with NG if her test is positive?

The answer is E

Surprised? Let's review the notion of predictive values.

The test performance characteristics (Sensitivity, Specificity) that we previously described on page 68, assess probabilities among persons *known* to be infected or uninfected.

When a patient presents to your office, you *don't know* whether she/he is infected or not: that's why you are asking for the test. So, what you want to know is not what is the probability that a test will be positive if a patient has the infection (sensitivity) but rather:

"Given that I have a positive test, what is the probability that my patient has the disease?"

In order to determine this, you need to know the sensitivity of the test, the specificity of the test, but also the prevalence of infection (pretest probability of disease) within the population. You may not always have that information, but you can extrapolate. We know that Susan has sex with women only, and that even in women who have female sex partners who also have sex with men, the prevalence of gonorrhea is very low, probably 1% or less. In another population, say street commercial sex workers, the prevalence of infection may be much higher at 15%.

Let's perform the gen-probe on two hypothetical populations: 1000 women who have sex with women (WSW) in which the prevalence of gonorrhea is 1% and 1000 commercial sex workers (CSW) in which the prevalence is 15%.

We know that the gen-probe is 80% sensitive and 98% specific.

1000 WSW with 1% prevalence = 990 uninfected and 10 infected. We perform a gen-probe which is 80% sensitive and 98% specific so:

10 infected	990 uninfected
x 80%	x 98%
8 test pos, 2 tests neg	970 test neg, 20 test pos

There are a total of 28 positive tests. Only 8 out of the 28 positive tests represent women who are truly infected. The others are false positives. Only 29% of the women who test positive are actually infected. This is the predictive value positive. Susan only has a 29% probability of actually having the infection if her test is positive!

1000 CSW with a 15% prevalence = 850 uninfected and 150 infected.
We perform the same gen-probe.

150 infected	850 uninfected
x 80%	x 98%
120 test pos, 30 test negative	833 test neg, 17 test pos

There are a total of 137 positive tests. 120 out of the 137 positive tests represent women who are truly infected. The others are false positives. 88% of the women who test positive are actually infected. This is the predictive value positive. A CSW has a 88% probability of actually having the infection if her test is positive!

You can see that the probability of infection is very different in each group, and that the prevalence of infection is an important factor if you are using a test that is not 100% specific.

Indeed, if you were to apply a test that is 100% specific to each population, no uninfected person would test positive. Therefore, all the positive tests you would get would be only from women who are truly infected.

Moral of the Story:

If you are going to screen low risk persons, where prevalence of disease is low, make sure you use the test that is the most specific. That way, you increase the probability that a positive test represents a true infection (Bayes Theorem). This is true for all clinical diagnostic tests we used in medical care.

Positive predictive values for any test are particularly dependent on the specificity of the test as well as the prevalence of disease in the population to be tested. If you are going to screen a low prevalence population, use the most specific test to reduce the probability of false positive tests.

Thanks to your knowledgeable calculations, you realize that Susan doesn't have a high probability of infection.

You call up Susan to tell her that:

A. Her test for gonorrhea is positive. She and her sexual partner should come in ASAP for treatment.
B. Her gen-probe for gonorrhea is positive, but you think it's a false positive. So both of you should just forget about it.
C. Her partner should come in for testing. If she is negative, than Susan's test really is a false positive.
D. Her gen-probe is positive, but you think it's a false positive. You would like to repeat it.
E. Her gen-probe is positive, but you suspect it may be a false positive. You would like a culture to be performed.

Answer to: How to manage Ms. Shy's positive test for gonorrhea?

A. Treat Ms. Shy and her partner ASAP for gonorrhea?

NOT the best choice. Assuming that this is a true positive is a strong leap of faith given Susan's history. She appears compliant and would probably greatly question the accuracy of your test (and with reason…). It's best to discuss with her the possibility of false positive results.

B. Forget about the results of the test and consider it negative?

NO! Even though the probability of infection is low, it's not absent, so you can't just brush off the results!

C. Have her partner come in for testing. If her test is negative, then so is Ms. Shy's test?

Not the best choice to solve the issue, but her partner should be offered testing. It's likely that if Susan's partner tests negative, Susan is also not infected. But this is an indirect assessment of Susan's test result, and tests are not 100% sensitive. However, since her partner has been sexually active with a man recently, she should be examined and screened, regardless of Ms. Shy's test results.

D. Repeat the same test?

Not the best choice. What if the test is positive again? Although this is very unlikely to happen, it doesn't change her probability of infection if positive.

E. Perform a culture.

This is the best choice. You will retest her with a culture is which 100% specific. If transport conditions are met, the culture is also very sensitive, so you are unlikely to miss an infection. Alternatively, if you can't fulfill transport conditions, an amplification test, which is highly sensitive and specific, would be an ideal choice.

Epilogue

Susan returns to your office and you culture her cervix for gonorrhea. The result is negative. However, her cultures for herpes done at the first visit were positive for HSV-1. You counsel her about herpes. You discuss the STD risk of her partner. Susan states she prefers to abstain from sex until her partner undergoes STD screening. You talk about HPV risk. Susan's partner presents to your office. Her only male contact was a few weeks ago. He has no history of STDs and has sex with only one other woman to whom he is married. Her examination is normal. The culture for gonorrhea and the ligase chain reaction for chlamydia are negative, as well as the RPR. She has had "cold sores" in the past, but has not been symptomatic for a few years. You discuss transmission risk and prevention. Susan and her partner decide to get tested for HIV. Their antibody tests come back negative.

The Case of Tracy Teen

In Summary…

Fourteen year old Tracy has just revealed to you in confidence that she has been engaging in some unprotected vaginal and oral intercourse with her 15 year old boyfriend for the past 2 months. She does not want her parents to find out that she is having sex because she thinks they will be quite angry with her, and probably ground her for the next year.

You also know from her responses that Tracy has some inaccurate information about risks of pregnancy and transmission of STDs. You are, however, encouraged by the fact that Tracy has been able to negotiate condom use when *she* believed it was necessary.

At this point you would like to obtain more information about Tracy's knowledge regarding reproductive health.

You would continue your assessment by:

Choose one or more answers

☐ **A**

Asking her where she turns for information.

☐ **B**

Asking her if she knows when ovulation occurs, how long sperm is viable, and what she has heard about STDs.

☐ **C**

Start by complimenting her on her attempts to practice risk reduction behaviors by using condoms, reinforcing that she has identified two important risks involved with sexual activity.

☐ **D**

Telling her she has got it all backwards (and where did she get this information anyway? Don't they have sexual education classes in her school?) and set her straight by giving her a quick lecture on reproductive biology.

Answer to: How to address Tracy's inaccurate information about risk of pregnancy and STDs?

A Is not the best answer. This age group is typically exposed to a great deal of misinformation, largely from peers, about issues related to sexuality. Assessing the extent of sexual communication within the family is important, however, so asking if she has talked with her parents about sexual development and reproduction is appropriate.

B Although it is important to assess the adolescent's understanding of sexual development and reproduction, firing a series of question is not the best way to start. You want to create an environment that will encourage her to ask questions and foster learning. So, you do need to elicit this information from Tracy, but don't want it to seem too much like a quiz!

C Is the best answer. Feedback that identifies strengths and positive will let the adolescent know that you are aware of his/her attempts to do the right thing. By acknowledging positive attempts to take responsibility for her own health, you are letting her know that you think that she is capable of making good choices. You can now go on to provide information that will hopefully result in better choices in the future.

D Avoid the tendency to lecture (however tempting…). Information is best when it is not focused on the negative aspects of behavior but rather on what was positive by the adolescent.

Key Points to remember

Issues related to sexuality should be explored and clarified for the adolescent. As with adults, it is important to provide information so that the adolescent will understand reasons for exam, screening, and pregnancy testing.

You want to make sure that you get through to Tracy. You know that information must be developmentally and culturally appropriate to facilitate learning.

Some helpful tools for creating a climate that is conducive for learning are:

Choose one or more answers

☐ **A**

Visual aids such as videos, charts, models, computer-assisted instruction, and pamphlets.

☐ **B**

Simple answers and avoiding the use of medical terminology.

☐ **C**

Feedback that identifies strengths as well as correcting inaccurate information.

☐ **D**

Repeating the essentials.

☐ **E**

Time for questions.

Answer to: How to get through to Tracy?

All of the above will help to create an environment that makes the most of "teachable" moments!

In addition, an understanding of the cognitive, physical, and psychosocial development stages for early (age 11 to 14 years), middle (age 15 to 17 years) and late (age 18 to 21 years) adolescence assists the provider in understanding an adolescent's individual concerns and learning needs.

Furthermore, you should screen carefully for substance use (alcohol and drugs) and other risk behaviors that are more prevalent in adolescents. Alcohol and drug use play a central role in the sexual activity of many adolescents, thus placing teenagers at higher risk of engaging in sex, particularly unprotected sex.

Ask about forced or coerced sex, for both male and female patients.

You discussed contraception with Tracy and made sure she received adequate knowledge for STD prevention.

Because Tracy has only been sexually active for the past 2 months, has only had one partner, and is asymptomatic,

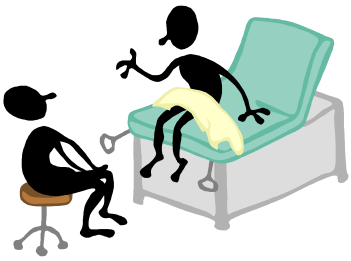
A gyn exam is not necessary at this time:

Choose only one answer

- ○ True
- ○ False
- ○ Not Sure?

Answer to: A pelvic examination for Tracy is not necessary?

False!



As previously discussed, STDs can be asymptomatic. This is particularly true for women and for chlamydial infections.

Although urine based testing for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* can be also be used for women, it should not obviate the need for a pelvic examination which can determine if other STDs are present (such as syphilis, HPV or trichomonas). Any female who has had sexual intercourse should have a pelvic examination.

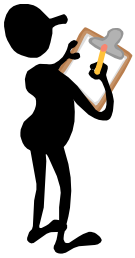
Because of Tracy's sketchy contraception, you would also want to determine the size of her uterus (in addition to a urine pregnancy test).

Should Tracy refuse a pelvic examination… then screening for CT and NG with a urine test would be appropriate, in addition to a pregnancy test. If such was the case, you would need to discuss the importance of the Pap smear.

Tracy consents to the pelvic examination. As this is her first, you patiently explain the steps as you gently proceed. The external genitalia and vaginal speculum examination are normal.

Would you do the following tests?

Choose only one answer for each



YES	NO	
○	○	Vaginal pH
○	○	Amine test
○	○	Vaginal yeast cultures
○	○	Saline Wet mount
○	○	Vaginal cultures for GV*
○	○	Gonorrhea test
○	○	Chlamydia test
○	○	Cervical gram stain
○	○	Pap smear

**Gardnerella vaginalis*

Answer to: Which laboratory tests to do in Tracy's case?

pH — **Yes!**
Amine test — **Yes!**
Vaginal yeast culture — **No!**
Saline wet mount — **Yes!**
Vaginal culture for GV — **No!**
Gonorrhea test — **Yes!**
Chlamydia test — **Yes!**
Cervical gram stain — **No!**
Pap smear — **Yes!**

We already have explained why at this time you would skip the yeast and *Gardnerella vaginalis* cultures (see page 85-6).

As previously mentioned, the gram stain is not sensitive nor specific for the detection of NG. Tracy does not have mucopurulent discharge from the endocervix. Her cervix appears normal, with ectopy, which is frequent during adolescence.

She should certainly get tested for NG and CT. Rates of gonococcal and chlamydial infections are highest among adolescent women. Performing a Pap smear is appropriate because it is recommended with initiation of sexual activity. If during the examination, you find inflammation of the cervix or signs of vaginal infection, it may be better to perform the Pap smear after appropriate treatment. Inflammatory cells may mask dysplastic cells or increase the probability of getting a result of "atypical squamous cells of unknown significance" (ASCUS) or inadequate specimen.

Trichomoniasis is asymptomatic in 50% of women. In the context of STD screening, even if the visual inspection of the vagina is normal, performing a pH, amine test and wet mount to detect Trichomoniasis is appropriate.

Would you do any other tests?

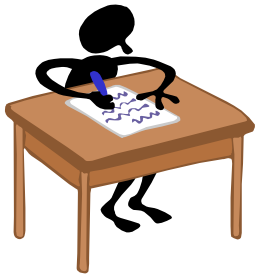
Syphilis is rare among adolescents, so routine screening is not recommended unless the teen is infected with another STD.

Counseling and testing for HIV can be offered now or at another visit, depending on time, resources and the patient's desires.

Finally, Tracy completed the immunization schedule for hepatitis B when she was 12 years old, so there is no need to test.

Having recently reviewed the latest screening recommendations for chlamydia you know that the recommendations for screening sexually active females who are the age of Tracy are:

(Write down recommended screening intervals)



In evaluating for STDs it is important to remember that:

- Adolescents are at greatest risk for STDs because they frequently have multiple partners (serial monogamy), unprotected intercourse, are biologically more susceptible to infection, and face multiple obstacles to utilization of healthcare.
- The rates of many STDs are highest among adolescents, i.e. the rate of gonorrhea is highest among females aged 15 – 19.
- Clinic-based studies have demonstrated that the prevalence of chlamydial infections, and possibly HPV infections also is highest among adolescents

Answer to: How often to screen women for *Chlamydia trachomatis?*

Age-based screening recommendations for *Chlamydia trachomatis*

Sexually active women ≤ 25 years of age*

At least once a year

Sexually active women > 25 years of age

Screen at least once a year if at risk**

*Screening women < 20 years of age is also recommended at *any* pelvic examination. Young and adolescent women are particularly at risk of infection. Recent published data suggest that a significant proportion of adolescents (11% or more) get reinfected with chlamydia within 4 to 6 months. Therefore, consider screening adolescents every six months. A urine test is ideal when you want to repeat screening and a pelvic examination is not indicated.

**Risk factors for infection include:

- inconsistent use of a barrier method in a non-monogamous relationship
- new or more than one sex partner in the last three months
- new partner since the last test
- infected with another STD
- partner has other sex partners or has symptoms of STDs

The CDC has revised its chlamydia screening guidelines.

The Health Employer Data Information Set (HEDIS) now includes a performance measure for chlamydia screening. The information contained in HEDIS is used to assess the quality of care provided by managed care organizations. The measure will evaluate the proportion of sexually active women aged between 15 and 24 enrolled in a plan that have been screened for *Chlamydia trachomatis* in one year. The CDC has revised its guidelines to parallel these quality measures.

STD Screening Guidelines for Adolescents

It is helpful to evaluate the risk of STDs for adolescents (which implies you have to ask about sex…)

Low Risk	Moderate Risk	High Risk
Older adolescent	Unstable relationship	Younger adolescent
Stable relationship	Multiple partners	Same sex partner (male)
Consistent condom use	History of STD or Pregnancy	Sexually abused
		Prostitution
		Other high risk behaviors
		Unstable living arrangements

For female patients at low risk:

- Annual pelvic examination with Pap, vaginal wet mount, gonorrhea and chlamydia testing.
- Offer HIV testing at least once

For female patients at moderate to high risk:

- Repeat gonorrhea and chlamydia testing at 6 months, either cervical or urine based.
- Offer HIV testing and syphilis screening yearly.

For male patients at low risk:

- Annual genitalia examination with gonorrhea and chlamydia testing. Ideally, a urine amplification test should be used. If this is not available, then perform a leukocyte esterase test (LET). If positive, test for NG and CT.
- Offer HIV testing at least once

For males at moderate-high risk:

- Repeat gonorrhea and chlamydia testing at 6 months, ideally urine based.
- Offer HIV testing and syphilis screening yearly.

Epilogue

You collect the samples in the following order: pH, amine test, vaginal swabs for wet preparations, cervical swab for a gonorrhea culture, a cervical swab for a chlamydia amplification test and then a Pap smear specimen.

Your saline wet mount is normal. You arrange with Tracy a way to contact her confidentially for test results. She says you can call her at home between 3 p.m. and 5 p.m. because both her parents work and her mother does not get home until 5 p.m. Both her tests for gonorrhea and chlamydia are positive. You tell Tracy that she has to come ASAP at your office and that she needs to bring her partner in. You are relieved that they show up the next day. You treat both of them with an oral dose of 400 mg of cefixime and 1 gm of azithromycin. Because of the presence of these two STDs puts them at risk of other STDs, you screen them both for syphilis and offer counseling and testing for HIV. The RPR and HIV antibody tests are negative for both teens.* You counsel them about STD prevention.

** Partner Management is always crucial for appropriate STD care. Tracy needs to tell her partner that he needs to be evaluated and treated. You can proceed as described above. Keeping drug company samples of medications for STD treatment in your office is useful. Tracy's partner will also need partner evaluation (where did the gonorrhea and chlamydia come from?). Alternatively, her partner can be referred back to his primary care provider and or to a clinic that offers free and confidential care. Remember that most states have laws that permit evaluation and treatment of STDs in minors without parental consent.*

The Case of
John Snow

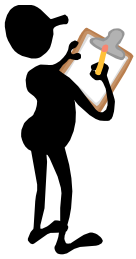
Summary

Mr. Snow is a 72 year old gentlemen coming in for his annual examination. In the course of his sexual history, he informs you that he has passive oral sex about once a month with a woman he pays. He's been doing this for nearly one year. He is not concerned about STDs given that he only has oral sex and he's too old for STDs.

Mr. Snow knows very little about this woman, but you conclude from his story that she is a commercial sex worker. You explain to Mr. Snow that he can be at risk of STDs even with only oral sex and that STDs can occur at any age. You complete his history and proceed with his examination. Your finding at the anogenital examination is the presence of a 0.5 cm superficial, well demarcated, painless, firm ulcer on the shaft of the penis. The inguinal lymph nodes are slightly enlarged but nontender.

Would you offer the following to Mr. Snow?

Choose only one answer for each



YES	NO	
○	○	A test for gonorrhea
○	○	A test for chlamydia
○	○	A urethral gram stain
○	○	A blood test for syphilis
○	○	A test for HIV antibody
○	○	A darkfield examination

Answer to: Which tests to offer to Mr. Snow?

A test for gonorrhea: **Yes!**

Men infected with *Neisseria gonorrhoeae* (NG) are generally symptomatic if the site of infection is the urethra. However, most pharyngeal infections are without symptoms. Anal infections can also be asymptomatic. When screening for NG, test at the sites of exposure(s) (throat/urethra/anus/cervix). In Mr. Snow's case, you would screen for urethral gonococcal infection. The fact that he only has oral sex certainly does not exclude him from any STD risk!

A test for chlamydia: **Yes!**

Population-based studies have demonstrated that men infected with *Chlamydia trachomatis* are frequently asymptomatic. Currently, it is recommended to screen only for urethral chlamydial infection in the context of routine male STD screening. Oral transmission of chlamydia trachomatis is relatively inefficient compared to vaginal exposure.

A blood test for syphilis: **Yes!**

There is a small lesion on the penis. Otherwise, there are no extra-genital lesions or skin rash. The ulcer is clean, non-tender, and slightly indurated. It is suspicious for syphilis or atypical herpes. The RPR should be performed. Remember however that up to 30% of patients who present with primary syphilis may have a negative RPR because they have not yet seroconverted. Mr. Snow's sexual partner is at high risk of STDs, including syphilis and herpes.

A urethral gram stain: **No!**

If you have access to NG and CT screening, a urethral gram stain from an asymptomatic male is unlikely to yield any significant information. Chlamydial urethral infection is often not associated with the presence of polymorphonuclear (PMNs) cells on the gram stain. So the absence or a low count of PMNs (< 5 per 1000x) does not rule out a chlamydial infection. The gram stain is also less sensitive than a gonorrhea test. In addition, it is likely that you are not equipped to perform this test in your office. There are particular CLIA requirements for moderate complexity tests, and experience is necessary for interpretation. Gram stains should not be performed in the pharynx because they are not specific.

A test for HIV: **Yes!**

Counseling and testing should be offered to Mr. Snow. Unprotected oral sex can be risky, although to a lesser degree than unprotected vaginal sex. His partner is at high risk of STDs and HIV.

A darkfield examination: **Yes!**

A darkfield examination can be done on fresh serous fluid expressed from genital lesions to search for *Treponema pallidum*. Unfortunately, this test is not readily available and requires expertise for proper interpretation. Proper specimen collection is crucial. Here is how you should proceed.

- clean lesion with normal saline, remove scab if present, and gently abrade with gauze.
- obtain serum specimen from lesion by gently squeezing the base of the lesion if necessary.
- avoid a bloody specimen.
- apply a glass slide to the oozing lesion or use a sterile bacteriological loop to transfer the fuid from the lesion to the glass slide. Prepare three slides.
- place coverslip on specimen and flatten.
- examine slide immediately.
- antibiotic ointment, soap or oral antibiotic may kill treponema and result in a negative DF. A bloody or cellular specimen may obscure reading.
- darkfield should not performed on because T. pallidum may be confused with a spirochete very similar in morphology, T. denticola, a nonpathogenic treponema often inhabiting the oral cavity.

Any other tests to offer?

A herpes culture would be appropriate. Herpes simplex virus is the most common cause of genital ulcer disease in the USA. Remember that cultures are more sensitive early in the disease, when a vesicle or ulcer is present. Make sure that when you take the specimen, you scrape the base of the ulcer carefully. It's important to get cells.

The Tzanck smear is a rapid, inexpensive test that can be performed to identify giant multinucleated cells which are associated with herpes virus infections. Sensitivity is about

50%. To get optimal results, you need to use the same procedure than the culture, that is, collect (with a swab or a scalpel) from the base of the lesions. Many cells are needed. Next, you:

- Apply cells to a slide
- Soak the smear in methanol for 5 minutes to fix the cells
- Flood with either Giemsa or Wright-Giemsa stain for at least 5 minutes
- Rinse with water, blot dry gently and read

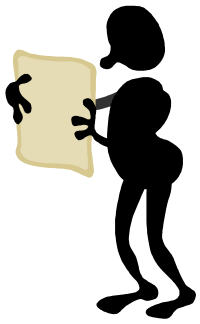
What about herpes serologies?

The new HSV-2 specific serologies turn positive at least two weeks after an initial primary infection. If the lesion is recent, and represents an initial primary infection, the test may not yet be positive. On the other hand, it is not unusual for an infection acquired many months (or years) ago to present as initial (non primary) lesions, either because the patient did not notice prior outbreaks before or because they were truly asymptomatic shedders. In this case, the HSV-2 serology would be positive. Then again, Mr, Snow may have HSV-1 because of the history of oral sex. So for the purpose of diagnosing the cause of this lesion, the culture is still the best tool.

Would you change any of your answers on page 53?

When you question Mr. Snow about his penile lesion, he tells you he noticed it about seven days ago. He thought it was some kind of zipper cut. It didn't hurt, so he didn't think much of it. He never had this before. The last time he had oral sex was about 3 weeks ago. You discuss your concerns with Mr. Snow. You don't have access to the darkfield, so you draw an RPR, provide counseling and testing for HIV, test for NG and CT, and culture the lesion for herpes. You tell Mr. Snow to abstain from sex, and you have him come back in three days. Because he is reliable, you prefer to wait for the result of some of the tests before treating him.

Here are the results of testing:



The ligase chain reaction for *Chlamydia trachomatis* and *Neisseria gonorhoeae* is negative.

The RPR is positive with a titer of 1:64.

The herpes culture is negative. The HIV test result is pending.

You can't believe it. Syphilis at that age.

Given the history and test results, a treponemal test is not necessary to confirm the presence of primary syphilis.

Choose only one answer

- ○ True
- ○ False
- ○ Not Sure

Answer to: No need to perform a treponemal test?

False!

No matter what the clinical manifestations are, you should always confirm a non-treponemal test with a treponemal test (FTA-ABS or TP-PA).

There are multiple reasons for biological false positive (BFP) tests, including advancing age. A high titer (≥ 1:8) does not exclude BFPs.

Potential causes of false positive serologic tests for syphilis

Nontreponemal tests (VDRL, RPR)

acute:	viral hepatitis	chronic:	HIV
	infectious mononucleosis		connective tissue disease
	varicella		Lupus erythematosus
	measles, mumps		narcotic addiction
	viral pneumonia		aging
	tuberculosis		leprosy
	other viral infections		malignancy
	immunizations		multiple myeloma
	pregnancy		chronic liver disease
	malaria		multiple blood transfusions
	bacterial infection		
	advanced cancer		
	chancroid, LGV		
	mycoplasma pneumoniae		
	rickettsial disease		

Treponemal tests (FTA-ABS, MHA-TP*)

In general, the MHA-TP gives fewer false positive results

acute:	Lyme disease (FTA)	chronic:	discoid lupus
	malaria		injecting drug use
	leprosy		systemic lupus erythematosus
	leptospirosis		
	relapsing fever		
	infectious mononucleosis		
	non syphilis treponemal diseases yaws & pinta		

** may also occur with TP-PA*

Epilogue

The TP-PA was positive and Mr. Snow was treated for primary syphilis. The STD Division was contacted. Mr. Snow agreed to meet with a disesase intervention specialist, who performed partner notification. The HIV antibody test was negative. Mr. Snow was counseled about STD prevention. His HIV antibody test was repeated 3 months later because genital ulcer disease can increase the risk of acquisition of HIV. This time, it came back positive. Mr. Snow was referred to an HIV specialist.

Review of STD Screening Recommendations

Sexual history on everyone!!

Remember, screening refers to testing sexually active persons *without any signs or symptoms of infection.*

- Female and Male Adolescents (14-19)
  See page 114-115.

- Females aged 20-24
  Screen for *Chlamydia trachomatis* at least once a year.
  Screen for *Neisseria gonorrhoeae*, syphilis and HIV if at risk.

- Females aged 25 and older
  Screen for *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, syphilis and HIV if at risk.

- Males aged 20-24
  Screen for *Chlamydia trachomatis* at least once a year, ideally with a urine amplification test.
  Screen for *Neisseria gonorrhoeae*, syphilis and HIV if at risk.

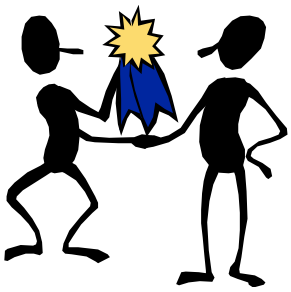
- Males aged 25 and older
  Screen with LET if at risk. Test for *Chlamydia trachomatis* and *Neisseria gonorrhoeae* if LET positive.
  Screen for syphilis and HIV if at risk.

Risk factors include:

- Multiple sexual partners or new sexual partner(s)
- Partner has other sexual partners
- Partner has symptoms consistent with an STD
- Presence of another STD
- Injecting drug use

Now that you have completed this second section of the module, you should be able to:

1. Identify risk factors for sexually transmitted infections
2. Test for the appropriate sexually transmitted infections based on the sexual history and examination
3. Identify the appropriate tests used for screening commonly encountered STDs
4. Describe the screening recommendations for *Chlamydia trachomatis*



Congratulations on completing this first self-study module on the management of Sexually Transmitted Diseases!

You should now be more knowledgeable on sexual history taking, STD laboratory diagnostic tests and screening recommendations as well as partner management.

We have included in the next pages relevant references for more in depth information about certain topics. In addition, a list of web sites has been added to let you know where you can get up-to-date information on STDs.

If you wish to obtain Continuing Medical Education Credits, please read the instructions, complete the post test included in your packet and send it to:

STD/HIV Prevention Training Center of New England
Division of STD Prevention
State Laboratory Institute
305 South Street
Boston, MA 02130

Index

General References

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Relevant web sites

www.cdc.gov The web site for the Federal Centers for Disease Control and Prevention. Reports and recommendations under the MMWR listing

http://www.STDHIVpreventiontraining.org The web page for the National Network of STD/HIV Prevention Training Centers. Information on courses, satellite broadcasts and curriculum outlines

www.asha.org American Social Health Association. Information on a variety of STD related topics

www.magnet.state.ma.us The Massachusetts Department of Public Health, under the heading for STD Division. Guidelines and patient information sheets.